

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TING WANG,
ALLAN SCHWEITZER,
and MAXIMILIAN OTT

Appeal No. 2003-1509
Application 09/853,575¹

HEARD: December 11, 2003

Before BARRETT, GROSS, and BLANKENSHIP, Administrative Patent Judges.

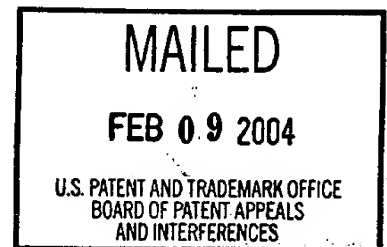
BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) from the second rejection of claims 1-5, 19, 20, and 43.

We affirm, but enter a new ground of rejection.

¹ Application for patent filed May 14, 2001, entitled "Optical Luminescent Display Device," which is a continuation of Application 09/246,145, filed February 8, 1999, now U.S. Patent 6,307,987, issued October 23, 2001, which is based on and claims priority from U.S. Provisional Patent Application 60/098,769, filed September 1, 1998.



BACKGROUND

The invention relates to a display device and method having a luminescent material irradiated by energy propagated from the side of an optical fiber, and this device in combination with an optical pickup which communicates with the luminescent material.

Claim 1 is reproduced below.

1. A combination comprising:
an optical fiber containing a notch; and
a luminescent material;

wherein said notch is configured so as to direct radiant energy within the fiber toward the luminescent material.

The examiner relies on the following references:

Appeldorn et al. (Appeldorn '643)	5,659,643	August 19, 1997
Crossland et al. (Crossland) (PCT application)	WO 95/27920	October 19, 1995

Claims 1-5, 19, 20, and 43 were finally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-40 of U.S. Patent 6,307,987. The rejection is not repeated in the examiner's answer and could be considered withdrawn. See Ex parte Emms, 118 USPQ 180, 181 (Bd. App. 1957); Manual of Patent Examining Procedure (MPEP) § 1208 (8th ed. Aug. 2001) ("any rejection not repeated and not discussed in the answer may be taken by the Board as having been withdrawn"). Nevertheless, we consider the rejection for completeness.

Claims 1-5, 19, 20, and 43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Crossland and Appeldorn '643.

We refer to the rejection (Paper No. 9) (pages referred to as "FR__") and the examiner's answer (Paper No. 15) (pages referred to as "EA__") for a statement of the examiner's rejection, and to the second appeal brief (Paper No. 14) (pages referred to as "Br__") for a statement of appellants' arguments thereagainst.²

OPINION

Double patenting

The examiner held claims 1-5, 19, 20, and 43 to be obvious over claims 1-40, in particular, claims 1, 14, 20, 21, 34, 36, and 37 of appellants' U.S. Patent 6,307,987 ('987 patent) because those claims contain all of the limitations of the present claims (FR3). Appellants state that this issue will be best addressed after all other patentability issues have been resolved so that the claims are in their final form for comparison against the claims of the '987 patent and that appellants expect to file a terminal disclaimer to remove the rejection should the claims be found allowable in their present form (EA3). Thus, appellants apparently concede that the claims in their present form would

² Although appellants' first appeal brief (Paper No. 12), ostensibly addressed the rejection of Crossland and Appeldorn '643, the examiner found the arguments to be directed to Appeldorn et al. (Appeldorn '876), U.S. Patent 5,432,876, issued July 11, 1995, and required a new brief (Paper No. 13).

have been obvious over the claims of the '987 patent by their intent to file a terminal disclaimer. Nevertheless, since no terminal disclaimer has been filed, the issue still remains outstanding. Although the obviousness-type double patenting rejection is not repeated in the examiner's answer and could be considered withdrawn, we previously noted that we would consider the rejection in the interest of deciding all relevant issues.

We agree with the examiner's reasoning in the final rejection. Since the claims in the '987 patent contain all of the limitation of the present claims, plus more, the present claims would have been obvious and, in some cases, anticipated by the claims in the '987 patent; e.g., claim 3 in the present application is clearly anticipated by claim 1 in the '987 application because every limitation in claim 3 is found in claim 1. The obviousness-type double patenting rejection of claims 1-5, 19, 20, and 43 is sustained.

Claim interpretation

Initially, as a matter of claim interpretation, we note that the claims do not recite a display, do not require addressing of a pixel using two different frequencies of light, do not require any specific location for luminescent material (inside or outside the notch), do not exclude liquid crystal shutters in between the optical fiber and the luminescent material, and do not recite any specific relationship between the notch and the luminescent

material other than the broad recitation that the notch is configured to direct radiant energy within the fiber toward the luminescent material (i.e., there is no claimed one-to-one correspondence between a notch and a piece of luminescent material, so it is sufficient if the notches provide a uniform illumination to the luminescent material).

Contents of the references

Crossland discloses, e.g., Figs. 2 and 6, a liquid-crystal display (LCD) screen including a backing layer 17 acting as a light guide for ultra-violet (UV) activating light; a liquid-crystal (LC) layer 29 containing cells which when suitably addressed allow light to pass from the backing layer through the cell; and an emitting layer containing phosphor-type elements 35, 37, 39 corresponding to the cells, for emitting display light when the activating light reaches them; characterized by means for collimating the activating light towards the phosphor-type element (abstract; p. 5, lines 9-19). The UV light can be applied to the backing layer 17 either through the back surface, indicated at 61, or at its edge or edges 20, indicated at 57 (p. 14, lines 25-28). The phosphors overcome the problem of restricted viewing angle in LCDs (p. 2, line 8, to p. 3, line 5). The collimating means can be a grid of apertures in a reflective layer 21 (Fig. 2; p. 14, lines 2-5); protuberances 47 around the opening which act as collimating lenses (Fig. 3, p. 14,

lines 5-8); locating the LC material in discrete holes 49 in an opaque substrate 51 (Figs. 4 and 5; p. 15, lines 10-20); using etched depressions 81 in the backing layer 17 to scatter the UV light (Fig. 6; p. 15, lines 21-29); and using lenslets (Fig. 7; p. 15, line 30 to p. 16, line 3).

Appeldorn '643 discloses an array of notched optical fibers which emits light from the side of the fibers due to notches. A lens 32 may be used to redirect the light emitted from the fiber (Fig. 1; col. 3, lines 60-65).

Claims 1-5, 19, and 20

The rejection

The examiner finds that Crossland discloses a general layout of pixels in a display including a light-guide backing layer 17, a luminescent material 35, and a notch 85 forming in the backing layer 17 and adapted to direct radiant energy within the backing layer 17 toward the luminescent material 35 (FR3-4). The examiner finds that the backing layer 17 is a light guide and "[p]lanar light-guiding substrates and cylindrical light-guiding substrates (i.e. optical fibers) both operate on the same principles of total internal reflection" and are "functionally equivalent" (FR4). The examiner concludes that one of ordinary skill in the art would have recognized that any well known light guide could be incorporated as a backing layer in the invention of Crossland, such as the side-emitting optical fibers taught by

Appeldorn '643, and, hence, it would have been obvious to incorporate an array of side-emitting optical fibers as taught by Appeldorn '643 as a backing layer in Crossland (FR5).

Analysis

Appellants argue that Crossland does not teach or suggest using anything other than a lightguide substrate 17 (Br6). It is argued that there is no support for the examiner's allegation that one of ordinary skill in the art would have recognized that any well known light guide could be incorporated as a backing layer in Crossland (Br8).

The examiner responds that Crossland does not teach that a specific backing layer must be used, but finds that one of ordinary skill in the art would have recognized that any known light-guiding transparent substrate could be used as the backing layer 17 in Crossland (EA4-5).

Crossland does not teach a specific backing layer construction, since it only shows side views of the backing layer, although it is implied that the backing layer is a rectangular sheet of transparent material which can be lit from the back, shown at 61, or from the edge, shown at 57. We find that one of ordinary skill in the art had sufficient skill to recognize that other light sources could be used to backlight the LCD array in Crossland. The content of the prior art includes not only what the references expressly teach, but also the

inferences which one of ordinary skill in the art would reasonably have been expected to draw therefrom. See Merck & Co., Inc. v. Biocraft Laboratories, Inc., 874 F.2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989); In re Jacoby, 309 F.2d 513, 516, 135 USPQ 317, 319 (CCPA 1962) (one of ordinary skill in the art must be presumed to know something about the art apart from what the references expressly disclose). The light source could provide direct uniform illumination perpendicular to the back of the LCD, as suggested by light 61, or could provide illumination from the edge, as suggested by light 57. The light source could also consist of individual light sources at each of the LC cells because the purpose of the openings in the reflective layer 21 and the protuberances 47 is to direct light to the individual cells (e.g., p. 14, lines 1-5). Nevertheless, there must still be some suggestion for using a different light source in the LCD environment of Crossland.

Appellants argue that Appeldorn '643 does not teach or suggest using optical fibers as a light guide for the activating light for a phosphor-type light emitting element because Appeldorn '643 discloses illumination devices wherein the optical fibers themselves serve as direct sources of visible light (Br6-7). It is argued that because Appeldorn '643 teaches a direct source of light, it teaches away from a device wherein

radiant energy is emitted into an optical fiber, and is then directed via the optical fiber to a luminescent material (Br8).

The examiner responds that Appeldorn '643 is not relied on for teaching directing activating light toward a luminescent element, but is relied on for its teaching of an illumination device including a layer or array of side-emitting optical fibers having notches in Figs. 4 and 6 (EA6; EA7).

We agree with the examiner that Appeldorn '643 is not relied on for the luminescent element. One cannot attack reference showings individually. In re Merck & Co., 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986). Appeldorn '643 does not teach that the fiber optic lighting fixture cannot be used in combination with a luminescent material and does not teach away.

Appellants argue that the examiner's position that it would have been obvious to incorporate an array of side-emitting optical fibers, as taught by Appeldorn '643, as the backing layer in Crossland, is not supported by Appeldorn '643 or Crossland for the reasons previously argued, i.e., Crossland does not suggest anything other than layer 17 as a light guide and Appeldorn '643 teaches to use optical fibers as direct sources of light (Br7-8).

These arguments have been previously addressed.

Appellants argue that the function and operation of optical fibers, particularly notched optical fibers which are capable of selectively emitting light only at the notches, are quite

different from the light-diffusing panels which receive light from a source and provide a plane of light as implemented in Crossland (Br8). Thus, it is argued, without benefit of appellants' own disclosure, one skilled in the art would not have been motivated to replace Crossland's layer 17 designed to illuminate all of the lenslets in a two-dimensional array with an array of optical fibers wherein each fiber is designed to provide selective illumination in only one direction, i.e., only at the notches thereof (Br8-9).

The examiner responds that Crossland teaches that indentations or protuberances (notches) may be provided in the backing layer, forming points from which the radiation is emitted and, therefore, Crossland does teach that light is selectively emitted at points formed by the indentations or protuberances (notches) formed in the backing layer (EA9-10).

The weakness in the examiner's rejection is the lack of a teaching of motivation to combine. Although Crossland is silent about the use of other light sources, we find that one of ordinary skill in the art had sufficient skill to recognize that other light sources could be used to backlight the LCD array in Crossland. However, there needs to be some motivation to substitute another specific light source. Appeldorn '643 teaches the use of a planar arrangement of notched optical fibers for illumination but does not teach that such arrangement would

produce a uniform plane of illumination, except in the background description of Appeldorn '876 (col. 2, lines 1-6), which the examiner does not appear to rely on. Thus, it is not readily apparent that the light source in Appeldorn '643 would be recognized as a suitable a light source for the LCD in Crossland. We are not persuaded by the examiner's reasoning that one skilled in the art would have been motivated to combine Crossland and Appeldorn '643 because the backing layer 17 of Crossland and the optical fiber of Appeldorn '643 both utilize the principle of total internal reflection. The fact that a light source uses total internal reflection does not say anything about its suitability for use as a backlight for an LCD. Furthermore, while Crossland shows etched depressions 81, these are not clearly analogous to notches in the sidewall of an optical fiber because the notches direct light to the opposite wall. For these reasons, we conclude that the rejection does not provide convincing motivation for combining the planar optical fiber array of Appeldorn '643 with the LCD of Crossland, or that the optical fiber array of Appeldorn '643 would work as a light source in Crossland. Accordingly, the rejection of claims 1-5, 19, and 20 is reversed.

Claim 43

Claim 43 includes the limitations of the other independent claims and further defines an "optical switch" in the preamble and "an optical pickup arranged to optically communicate with said luminescent material" in the claim body. The "optical pickup" is shown in appellants' Fig. 6.

Because we conclude that the combination of Crossland and Appeldorn '643 does not suggest the limitations of an optical fiber, a luminescent material, and a notch formed in the optical fiber to direct radiant energy within the optical fiber toward the luminescent material, for the reasons discussed in connection with the rejection of claims 1-5, 19, and 20, it does not make obvious the subject matter of claim 43 without the optical pickup. Thus, the rejection of claim 43 is reversed.

Nevertheless, we comment on the examiner's rejection.

The examiner states that one of ordinary skill in the art would have recognized the advantages of incorporating an optical pickup in Crossland and, hence, adding an optical pickup to Crossland would have been obvious (FR5). The examiner provides no factual support for this statement.

Appellants argue that the examiner's assertion finds no bases in any of the references and that one of ordinary skill in the art would have no reason for incorporating an optical pickup

device in either Crossland's display device or Appeldorn '643's illumination device (Br9).

The examiner states that the limitation "an optical switch" in the preamble has not been given patentable weight because the portion of the claim following the preamble is self-contained and does not depend for completeness on the preamble (EA10-11). The examiner finds that optical pickups are commonly used to receive optical signals in optical systems and "[o]ne of ordinary skill in the [art] would have recognized that the light emitted by the display device disclosed by Crossland et al. could be received by any of numerous well known optical pick-ups for a variety of reasons, including analyzing and/or testing the light output from the display device of Crossland et al." (EA11).

We agree with appellants that there is no suggestion in either Crossland or Appeldorn '643 to provide an optical pickup. The examiner states in the final rejection that one of ordinary skill in the art would have recognized the advantages of incorporating an optical pickup in Crossland, but does not identify these advantages or produce any evidence that these advantages were known. Thus, this reasoning is not persuasive. As to the examiner's new reasoning in the examiner's answer, that an optical pickup could be provided for many reasons, "including analyzing and/or testing the light output from the display in Crossland" (EA11), no factual support has been provided for such

a conclusion. It is not sufficient to make up motivation, no matter how plausible it may sound, without supporting the reasons with factual evidence that can be reviewed. As to the examiner's claim interpretation, we may agree that the "optical switch" in the preamble is not positively recited in the combination, but the optical pickup optically coupled to the luminescent material is recited in the body of the claim and cannot be ignored or dismissed without evidence of obviousness.

New ground of rejection pursuant to 37 CFR § 1.196(b)

Claims 1-3, 5, 19, and 20 are rejected under 35 U.S.C. § 103(a) as unpatentable over Crossland and Appeldorn '876. The teachings of Crossland have been previously discussed. Appeldorn '876, Fig. 10, discloses an LCD comprised of a liquid crystal shutter (LCS) array 50 illuminated by a substantially parallel array 46 of notched optical fibers 48 (col. 12, lines 39-44). The level of ordinary skill in the art is evidenced by the references. See In re Oelrich, 579 F.2d 86, 91, 198 USPQ 210, 214 (CCPA 1978) ("the PTO usually must evaluate both the scope and content of the prior art and the level of ordinary skill solely on the cold words of the literature"); In re GPAC Inc., 57 F.3d 1573, 1579, 35 USPQ2d 1116, 1121 (Fed. Cir. 1995) (the Board did not err in adopting the approach that the level of skill in the art was best determined by the references of record). The difference between the subject matter of

claims 1-3, 5, 19, and 20, and Crossland is that Crossland does not use an optical fiber containing a notch to illuminate the LC cells and the luminescent material. One of ordinary skill in the art would have been motivated to substitute the substantially parallel array 46 of notched optical fibers 48 of Appeldorn '876 for the backing layer 17 of Crossland since Appeldorn '876 expressly teaches that the optical fiber array can be used as an illumination source for an LCD. Alternatively, the difference between the subject matter of claims 1-3, 5, 19, and 20, and Appeldorn '876 is that Appeldorn '876 does not illuminate a luminescent material with the light from the notched optical fibers. One of ordinary skill in the art would have been motivated to provide phosphors at the viewing side of the LC shutters in Appeldorn '876 to increase the viewing angle in view of the teachings in Crossland (p. 2, line 8, to p. 3, line 5).

Although appellants' first appeal brief (Paper No. 12), ostensibly addressed the rejection of Crossland and Appeldorn '643 (p. 2), the examiner found the arguments to be directed to Appeldorn '876 and required a new brief (Paper No. 13). Since the first appeal brief refers to figures 1, 9, and 10 and column 12 of Appeldorn (Paper No. 12, p. 6), and since Appeldorn '643 does not have figures 9 and 10 or a column 12, but Appeldorn '876 does, it is clear that the brief was, in fact, directed to Appeldorn '876. Thus, as pointed out by appellants'

counsel at the oral hearing, the combination of Crossland and Appeldorn '876 has already been briefed (although it may not be apparent from the brief). Nevertheless, we are not dissuaded from making a new ground of rejection by appellants' arguments.

The fact that Crossland does not disclose any other kind of backing layer 17 for the LCD is not persuasive of nonobviousness because the rejection is based on the combination with Appeldorn '876 which teaches a notched optical fiber light source for an LCD. One of ordinary skill in the art would have been motivated to substitute the substantially parallel array 46 of notched optical fibers 48 of Appeldorn '876 for the backing layer 17 of Crossland since Appeldorn '876 expressly teaches that the optical fiber array can be used as an illumination source for an LCD. The fact that Appeldorn '876 does not disclose directing light from the notched optical fibers toward a luminescent material is not persuasive of nonobviousness because the rejection is based on the combination of Crossland which teaches using a phosphor material at the viewing side of the LC shutter to improve the viewing angle. One of ordinary skill in the art would have been motivated to provide phosphors at the viewing side of the LC shutters in Appeldorn '876 to increase the viewing angle in view of Crossland. Thus, we find motivation in both references to make the proposed combination.

Appeldorn '876 (and Appeldorn '643) teaches that light is reflected through the side wall of the optical fiber transversely opposite from the notch. Therefore, we find no suggestion to mount a reflective coating on the optical fiber transversely opposite from the notch as recited in claim 4.

As to claim 43, we agree with the examiner's claim interpretation that "optical switch" in the preamble does not positively require a switch as part of the combination because it is not referred to in the body of the claim. The term "optical pickup" has not been defined by either the examiner or appellants: it could mean just a piece of optical fiber that picks up and transmits light from the luminescent material and does not necessarily imply any switching function. Nevertheless, no structure that could be considered an optical pickup is shown in Crossland. We do not agree with the examiner that such a limitation can be dismissed as obvious without a reference. Accordingly, claim 43 is not rejected.

CONCLUSION

The rejection of claims 1-5, 19, 20, and 43 based on obviousness-type double patenting is sustained.

The rejection of claims 1-5, 19, 20, and 43 under 35 U.S.C. § 103 is reversed.

A new ground of rejection has been entered as to claims 1-3, 5, 19, and 20.

In addition to affirming the Examiner's rejection of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides, "A new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

(b) Appellant may file a single request for rehearing within two months from the date of the original decision

37 CFR § 1.196(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should appellants elect to prosecute further before the primary examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145

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with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

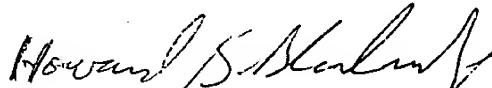
AFFIRMED - 37 CFR § 1.196(b)



LEE E. BARRETT
Administrative Patent Judge



ANITA PELLMAN GROSS
Administrative Patent Judge



HOWARD B. BLANKENSHIP
Administrative Patent Judge

BOARD OF PATENT
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